Simulated Moving Bed Chromatography as an alternative capturing tool for bio-based chemicals

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Production of bio-based chemicals, be it products of fermentation processes or substances extracted directly from natural sources, often require complex multistep separation processes. Capturing, the first steps, releasing the target substance from the major components of the matrix, has direct influence on the costs and even on the feasibility of a production process and thus the choice of proper tools is of outstanding importance.

Precipitation and extractive methods are common choices, complemented by membrane processes and chromatography for higher value products. All tools bear specific problems like, e.g. utilization of organic solvents, bad scalability, high desorbent consumption or bad long time stability.

Simulated moving bed chromatography (SMB-Chromatography), a continuous adsorption process, is an established method for the purification of bio-based products [1,2] but also shows potential as a primary recovery tool. SMB is able to “extract” chemicals out of a solution by using liquids which are miscible with the initial solvent. SMB-Chromatography can thus be seen as an extraction process, avoiding the disadvantage of organic solvents without strong dilution as known from batch chromatography.

Based on previous work on laboratory scale single column SMB-Chromatography [3] we want to give some examples on how SMB-Chromatography can effectively be used to directly isolate substances from crude mixtures like fermentation broth or plant extracts.